Follow (or don't follow) the crowd: Young children's conformity is influenced by age and task domain

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Abstract

This study investigated whether young children's conformity to a consensus varies across the normative domain and age. One-hundred-and-sixty-eight 3- and 5-year-olds participated. Each child was presented with a puzzle box that had two transparent compartments. In a reward preference condition, one of the compartments contained one sticker, while the other contained 12 stickers. In a perceptual judgement and an arbitrary preference condition, one compartment contained a short plank, while one contained a perceptually longer plank. Each child was shown a video of four female adults who were each asked the same question within condition: "Which one's the biggest?" (perceptual task; each model retrieved the smaller block)', "Which one do you want?" (reward preference; each model retrieved the smaller reward), and "Which one do you want?" (arbitrary preference; each model retrieved the smaller plank). Children were then asked the same question by condition, and allowed to retrieve the item. Notably, more children conformed in the arbitrary preference condition than in the reward preference and perceptual judgement conditions, with three-year-olds conforming significantly more than five-year-olds. Five-year-olds were more successful, and imitated with greater fidelity, including demonstrating overimitation. However, less overimitation was observed in the arbitrary preference condition. Together, these findings show that children are sensitive to the contextual cues of the domain in which they are witnessing norms, and vary their own conformity based on such cues. Further, children can navigate which information to copy to fulfil their own ends.

Follow the crowd (or don't): Young children's conformity is influenced by norm domain and age

Conformity to norms has a powerful influence on individual judgements, attitudes and behaviour, as demonstrated by the classic work of Sherif (1935, 1936, 1937) and Asch (1951, 1955, 1956). Due to the critical role of conformity in our choices and behaviour, it is essential that we understand how judgements arise in the face of conflicts in normative information: notably, the conflict between individuals' personal information and the majority's behaviour (Asch, 1951), as well as between different types of information presented by norms, 'injunctive' information about what one should do and 'descriptive' information about what the majority does (Deutsch & Gerard, 1955). 'Social norms' and 'conformity' are terms with many uses, and as a result there is no consensus about meaning (Bichieri & Muldoon, 2011; Chun & Rimal, 2016). For the purpose of the present study, we use 'norm' to be the behaviour adopted by the majority of a group, and 'conformity' to mean behaving in line with the majority behaviour. A 'consensus' is an unanimous group behaviour. For instance, if most individuals do not litter, this is the norm; if all individuals do not litter, that is a consensus; and if I do not litter because of the influence of the group I am conforming. Recently, the influence of norms has been examined in the context of children's learning, addressing questions relating to how children use norms to guide their own learning and behaviour (e.g., Corriveau, Fusaro & Harris, 2009; Morgan, Laland & Harris, 2015; Turner, Nielsen, & Collier-Baker, 2014). The aim of the present study is to examine how levels of children's behavioural conformity to the descriptive norm vary by task domain; we discuss our results in terms of the possible processes which may cause the effects found.

Young children conform to social cues provided by majorities: three- and four-year-olds prefer the label given to an ambiguous object by a consensus of three individuals rather

than the label of a single individual (Corriveau, et al. 2009); showing adoption of descriptive norms. Further, four-year-olds adopt the behaviour of an informant whose response is supported by a group, through the smiles and head nods of two bystanders, over an informant who receives head shakes and frowns from the two bystanders (Fusaro & Harris, 2008), thus showing support for children's use of injunctive norms. Turner et al. (2014) compared three-year-olds' use of these different forms of normative behaviour, finding that children are influenced by descriptive over injunctive norms when the two are misaligned.

Conflicts also occur in relation to copying the majority versus the minority. Conforming to conventions is critical to societal functioning, as it allows new members of a group to pick up the social norms quickly without having to understand the rationale behind them. However, it is also essential that individuals do not blindly conform, adopting the behaviour of the majority when in fact this may be disadvantageous to the individual as well as to the group as a whole (Del Vicario et al. 2016), which can result in detrimental 'information cascades' (see Rieucau & Giraldeau 2009). Further, as well as not conforming to avoiding the adoption of inferior behaviours, individuals need to break from the *status quo* for new, advantageous innovations to appear within the technological and social practices (Dean et al. 2014). Thus it is critical that we understand how normativity affects learning in children and how biases for majority copying versus personal interests and information are navigated.

Explaining fidelity (copying) versus selectivity (using alternative options) in many realms of child learning remains a challenge. Over and Carpenter (2012) addressed this topic, pointing-out that while children can appear credulous, on other occasions they can be discriminating and rational in their learning, whether from several models or one. For instance, research into the imitation of causally irrelevant actions, known as 'overimitation', has shown that children (and adults) copy irrelevant actions under many conditions, including

when they believe that the experiment is over (Lyons, Young, & Keil, 2007), when there is a reward at stake (Flynn & Smith, 2012; Lyons, Damrosch, Lin, Macris, & Keil, 2011), and when the actions are presented by an individual they believe to be a fellow participant (Flynn & Smith, 2012). On other occasions children rationally mediate their imitation (Gergely, Bekkering, & Kiraly, 2002; Meltzoff, 1995). Over and Carpenter argue that three factors moderate fidelity versus selectivity: (i) desire to affiliate with the social group or model, (ii) social pressure felt in the situation, and (iii) the child's own goals. Others highlight that children construe the situation as being a 'ritual', in which behaviour is adopted by a conventional rather than instrumental function, suggesting that this may explain the discrepancies (Kapitany & Nielsen, 2015; Legare, Wen, Herrmann, & Whitehouse, 2015). Alternatively, Walker and Andrade (1996) provide evidence that situational ambiguity is an important factor, for children aged three to seventeen years, with greater uncertainty causing more conformity.

While there is still much research needed to address these differing explanations, several recent studies have cast light on the fact that the domain within which the normative behaviour is presented, as well the observing children's age, have an influence on conformity. Seston Schillaci and Kelemen (2014) found that 3- and 4-year-olds deferred to a majority's behaviour with regard to object-functions. Children were more likely to agree with the majority when majority and minority opinions were equally plausible, especially when the majority demonstrated an overt consensus. However, four-year-olds actively eschewed the majority opinion when it was implausible in the context of the artefact's functional design; in such cases four-year-olds trusted their own judgement over that of the majority. Similarly, Corriveau and Harris (2010) showed 3- and 4-year-olds deferred to a majority less often when their judgement would be functionally tested than when it was a perceptual judgement. That is, when they were making a judgement about the length of comparative lines they

deferred more than when those comparative lines would be used to build a bridge for a soft-toy protagonist to cross, than when they simply had to state which was longer. Recently, Bernard, Harris, Terrier and Clément (2015) gave a further demonstration of preschoolers' weighing-up of personal versus norm-based information. They found that 3- to 5-year-olds were more likely to rely on social information if personal information was ambiguous, and if there was a consensus of three individuals providing information, rather than one. Further, it was found that 5-year-olds were more likely to rely on personal than social information. Normative and moral social factors have also been shown to be important in young children's conformity and imitation (Kim, Chen, Smetana, & Greenberger, 2016; Rakoczy, Warneken, & Tomasello, 2009).

In the current study we directly tested 3- and 5-year-old children's conformity to a majority's judgement across three normative domains: (i) reward preference, in which the majority selected one sticker over twelve stickers, (ii) perceptual judgement, in which the majority was presented with two wooden blocks and selected an obviously smaller block when asked which is biggest, and (iii) arbitrary preference, in which the majority selected one of two blocks when asked which one they preferred (which clearly had no obviously 'correct' answer). We define 'normative domains' as contexts that draw on different cognitive and social processes. This study presents two critical extensions to the current understanding of conformity. First, it addresses whether young children show differing levels of conformity across different norm domains using a standardised procedure across each of these domains. In line with previous research, we predict less conformity in norm domains in which there is a clear contrast with one's own perception or desires (these are the reward preference and perceptual judgement domains), compared to domains in which the rationale for the majority's judgement is not clear or may indeed be conventional (the arbitrary preference domain) and there is no clear contrast with one's own judgement. Such domain differences

may also be influenced by the age of the participants, with younger children (3-year-olds) being more likely to conform across all the domains than older children (5-year-olds; mirroring developmental changes seen in other studies (Corriveau & Harris, 2010; Seston Schillaci & Kelemen, 2014; Walker & Andrade, 1996). The age groups chosen represent the beginning of early social development and, at five years, move into middle childhood. They, thereby, give us a clear picture of changes in norm use in early development, fitting with the majority of previous research in this area, which focus on 3- to 5-year-olds (Corriveau & Harris, 2010; Seston Schillaci & Kelemen, 2014; Walker & Andrade, 1996).

Recently, there has been increased interest in how aspects of context, including the social context, affect copying behaviour and the implications this might have for learning and cultural acquisition, transmission and evolution more broadly (Reader, Morand-Ferron, & Flynn, 2016). The current study adds to this literature by exploring whether a majority's behaviour, which was clearly inaccurate (as in the perceptual judgement task), less advantageous (as in the reward preference) or ambiguous (as in the arbitrary preference) influences a young child's subsequent behaviour in terms of the level of fidelity s/he demonstrates to the behaviour that s/he witnessed the majority undertake on a task. It could be argued that when majorities appear to be less accurate or undertake less advantageous behaviour they are less likely to be copied across other behaviours than majorities whose behaviour is ambiguous. For example, when a majority's behaviour was pitted against success, such that the majority's actions were unsuccessful in opening a puzzle box while the minority's behaviour was successful, 4- and 5-year-old children copied the behaviour of the minority (Wils, Collier-Baker & Nielsen, 2015). Thus, we predict that 3-year-olds should show greater fidelity, in terms of action replication including overimitation, when the majority's selection of an object is ambiguous than when it contrasts with a child's own preferences or perceptions than 5-year-olds. 'Overimitation' refers to children's proclivity to

copy obviously causally redundant actions, and has been argued to be influenced by the same factors as imitation and conformity (see Lyon et al., 2007; Kenward, Karlsson, & Persson, 2011; Keupp, Behne, & Rakoczy, 2013; Nielsen & Blank 2010). That is, while both judgment and imitation have been argued to be influenced by similar sets of social influence (Over & Carpenter, 2012), our study may give further information about how these phenomena are related. Addressing such questions establishes whether children are sensitive to the contextual cues of the domain in which they are witnessing the conformity of other's behaviour, varying their own conformity and subsequent behaviour based on such cues.

Method

Participants

One hundred and sixty-eight children from schools and nurseries in North East England participated. Participants were drawn from two age groups: three-year-olds (n = 84, 40 girls, M = 44.65 months, SD = 3.50 months) and five-year-olds (n = 84, 38 girls, M = 67.68 months, SD = 3.35 months). The majority of children were White British, Asian being the second most represented ethnic group. Informed consent was provided by the children's parents, and the nursery or school staff. Also all children verbally consented to participate when asked if they wished to take part. Ethical approval was given by the School of Education's Ethics Committee at Durham University.

Design

A 2 x 3 between groups design was used to assess whether age (3-year-olds versus 5-year-olds) and norm domain (reward preference, perceptual judgement, and arbitrary preference) influenced conformity. The key outcome variable was whether a child's choice of an object matched the choice of the group (conformed) or the child selected an alternative

option (did not conform). We also investigated, across these different groups (age and norm domain), whether children imitated the same sequence of actions as the group to remove the selected object from a puzzle box (imitation fidelity) or whether they did not replicate faithfully; this imitation fidelity included a measure of overimitation demonstrated by the majority. The children's success on the task, acquisition of the object from a puzzle box, was also recorded.

Apparatus

The Duobox was the apparatus used in this study (see Figure 1). It has two conjoined compartments which are identical, apart from the colour painted on the back wall of the apparatus: one compartment was blue, and one was red. The apparatus was transparent, such that the object contained inside each compartment could be seen easily. The sequence of actions modelled was: (i) the removal of the bolt from the top of the apparatus (labelled *a* in Figure 1), a causally irrelevant action allowing the study of overimitation. Then three different defences were removed to allow a door to be opened and the object retrieved: (ii) a horizontal latch was twisted to a vertical position (labelled *b* in Figure 1), (iii) a hook was pulled clockwise (labelled *c* in Figure 1), and (iv) a flat bolt was pulled to the right (labelled *d* in Figure 1). In the reward preference condition one of the compartments contained one sticker, while the other contained 12 stickers, identical in shape and size although with varying designs, including three replicates of the alternative single sticker, 100% of both three- and five-year-olds preferred the 12 stickers to the one in pilot testing ($N = 20$). In the perceptual judgement and arbitrary preference conditions one compartment contained a short plank of wood, while the other contained a long plank. The long plank was three-times the length, and pilot testing found that 100% of both three- and five-year-olds correctly identified their differential length from their position in the apparatus ($N = 20$).

[Figure 1 about here]

Conformity Stimulus

To establish the descriptive norm, children were showed a video of four female adult models opening the Duobox. Initially, the four models stood side-by-side, and then each model stepped forward in turn and opened the box using identical actions. Thus children saw each model: (i) step forward from the group, (ii) be asked a question regarding their perception or preference (differing based on condition), (iii) perform the same action sequence on the Duobox, (iv) retrieve the reward, and (v) return to the group. After each model retrieved the item from the Duobox, they held it towards the camera and smiled.

In the reward preference condition, each model's actions were preceded by the question "Which one do you want?"; with all models retrieving the *small* reward. In the perceptual judgement condition, each model's action was preceded by the question "Which one's the biggest"?, with all models retrieving the *smaller* plank, despite it being perceptually smaller. In the arbitrary preference condition, the model's actions were preceded by "Which one do you want?" All retrieved the smaller plank, there was no obvious natural preference for either plank. The side, red or blue, was consistent within the video with the models and within each child's attempt, but was counterbalanced across participants within conditions.

Procedure

Testing took place in a quiet room away from other children within a child's school or nursery. After a short settling period, children were shown the apparatus and asked a series of questions to clarify that they understood that, (i) it had two sides, (ii) the sides were different colours, and (iii) the contents of each side were different. Children then watched one of the

conformity stimuli videos. They were told that their job was to get something from inside the puzzle box. Following this, children were asked the same questions to that asked in the video ("Which one do you want?" in the reward preference condition and the arbitrary preference condition and "Which one's the biggest"? in the perceptual judgement condition). They were then allowed to retrieve the object from the Duobox. All children were thanked for their time, and received a sticker reward.

Coding

For the conformity measure the children's actions were coded as either matching the group (coded 1) or selecting the alternative (coded 0) depending on which compartment they interacted with first (this did not differ from the object selected). For imitation fidelity they were coded as either copying the removal of the defences exactly (coded 1), or using another sequence (coded 0). This was operationalised as successfully unlatching each defence in the exact order that had been demonstrated. This dichotomous coding was found to be the most explanatory way to code fidelity in this context. For overimitation, children were coded as having overimitated if they removed the causally irrelevant bolt (coded 1), or as not overimitating if they did not (coded 0). Finally, children were coded as successful if they retrieved the object from within the Duobox within 5 minutes (coded 1), or unsuccessful if they did not meet this criterion (coded 0). Testing was discretely recorded and coding was performed on the recorded data rather than live.

Contrast coding was employed to reflect the following key theoretical comparisons. The first was between the arbitrary preference (coded 2) and conditions in which there was a motivation to depart from the observed consensus, the reward preference (coded -1) and perceptual judgment (coded -1) conditions. The second was between the two competing motivation conditions: reward preference, coded 1, perceptual judgment, coded -1, with

arbitrary preference coded 0. For age, the five-year-old group was coded 1 and three-year-olds coded -1. When conformity is entered as a predictor, conforming is coded 1, and not conforming coded -1.

Results

To examine how age and norm domain affected young children's conformity, imitation fidelity, overimitation, and success, binary hierarchical logistic regressions were performed (bootstrapping 10,000 iterations). At step 1, age group along with norm domain were entered as predictors. For analyses of performance measures (imitation fidelity, overimitation, and success), conformity was also entered at step 1. The interactions between age group and norm domain were entered at step 2. Predictor analyses are reported in Table 1, descriptive norm domain by age group cell descriptive statistics are reported in Table 2. Our statistical model is performed in two steps to reflect our prioritisation of main effects, and then interactions. This statistical approach allowed us to examine differences based on experimental condition (which was of most theoretical importance, given our interest in the effect of normative domain), age, and then how these factors interacted. Where R^2 is reported it is the Nagelkerke R^2.

[Table 1 about here]

[Table 2 about here]

Conformity

At step 1, the model was significant, $R^2 = .14$, X^2 (3, $N = 168$) = 17.93, $p < .001$. Children demonstrated higher conformity in the arbitrary preference condition than the reward preference condition and perceptual judgment conditions, *OR* = 1.44, 95% CI [1.15, 1.87]. However, there was no significant difference in conformity between the reward preference and perceptual judgement conditions, *OR* = 1.29, 95% CI [.87, 2.02]. Further three-year-olds (50% conform, *SD* = 50%) demonstrated significantly higher conformity than five-year-olds (31%, *SD* = 47%), *OR* = .65, 95% CI [.45, .90].

At step 2, with the interaction terms in the model (for depiction see Figure 2), step change was non-significant, $\Delta R^2 = .01$, X^2 (2, $N = 168$) = 1.84, $p = .398$, but the full model was significant, $R^2 = .15$, X^2 (2, $N = 168$) = 19.78, $p = .001$. The same pattern of results was observed for age group, *OR* = .63, 95% CI [.37, .88]. This was also the case for arbitrary preference versus reward preference and perceptual judgment conditions comparison, *OR* = 1.45, 95% CI [1.16, 2.12], although there was no significant interaction with age, *OR* = 1.17, 95% CI [.92, 1.66]. Again, as in step 1, there was no significant difference between reward preference and perceptual judgment conditions, *OR* = 1.33, 95% CI [.85, 2.50]; with there, further, being found to be no interaction with age, *OR* = 1.07, 95% CI [.67, 1.96].

[Figure 2 about here]

Performance measures

When examining imitation fidelity, the model was significant, $R^2 = .12$, X^2 (4, $N = 168$) = 14.02, $p = .007$. Five-year-olds copied with higher fidelity than three-year-olds, *OR* = 1.62, 95% CI [1.11, 2.61]. There was no difference in imitation fidelity between arbitrary preference compared with reward preference and perceptual judgment, *OR* = .79, 95% CI [.53, 1.07]. Further, there was no difference in imitation fidelity between those who

conformed (15% exact copy, *SD* = 36%) and those who produced the alternative judgement/preference (29% exact copy, *SD* = 46%), *OR* = .75, 95% CI [.44, 1.15]. With the age group by norm domain interaction terms in the model, the change statistic was non-significant, ΔR^2 = .02, X^2 (2, *N* = 168) = 2.48, *p* = .248, but the full model was significant at step 2, R^2 = .14, X^2 (6, *N* = 168) = 16.51, *p* = .011. Age group remained significant in the same direction, *OR* = 1.54, 95% CI [.97, 40.37]. The arbitrary preference versus reward preference and perceptual judgment conditions comparison remained non-significant, *OR* = .82, 95% CI [.04, 3.73], as did the comparison of the reward preference and perceptual judgment conditions, *OR* = 1.15, 95% CI [.63, 2.25]; there was found to be no interaction with age for either of these comparisons, *OR* = .80, 95% CI [.15, 1.19], and *OR* = 1.12, 95% CI [.58, 2.08], respectively.

The model predicting overimitation was significant at step 1, R^2 = .16, X^2 (4, *N* = 168) = 20.60, *p* = .001. Five-year-olds (62% overimitated, *SD* = 49%) overimitated significantly more than three-year-olds (34% overimitated, *SD* = 48%), *OR* = 1.81, 95% CI [1.34, 2.61]. Children in the arbitrary preference condition overimitated less when compared with the reward preference and perceptual judgment conditions, *OR* = .77, 95% CI [.59, .98]. However, there no difference in performance of overimitation behaviour between the reward preference and perceptual judgement conditions, *OR* = .78, 95% CI [.51, 1.19]. There was also no difference in overimitation between those children who conformed (40% overimitated, *SD* = 49%) and those who did not (53% overimitated, *SD* = 50%), *OR* = .95, 95% CI [.66, 1.33]. At step 2, the change statistic was non-significant, ΔR^2 = .01, X^2 (2, *N* = 168) = 1.56, *p* = .459; the full model was significant, R^2 = .17, X^2 (6, *N* = 168) = 22.16, *p* = .001. The pattern of results was not changed with the interaction terms in the model. Age was a significant predictor, *OR* = 1.82, 95% CI [1.32, 2.75]. There was a significant difference between arbitrary preference versus reward preference and perceptual judgment conditions,

OR = .77, 95% CI [.57, .98], although the interaction with age was non-significant, *OR* = 1.03, 95% CI [.80, 1.37]. The difference between reward preference and perceptual judgment conditions was non-significant, *OR* = .79, 95% CI [.51, 1.21], likewise for its interaction with age, *OR* = 1.28, 95% CI [.85, 1.98].

In terms of task success, the model was significant at step 1, R^2 = .23, X^2 (4, *N* = 168) = 23.01, *p* = .001. Five-year-olds (96% successful, *SD* = 19) were significantly more successful than three-year-olds (76%, *SD* = 43), *OR* = 2.74, 95% CI [1.55, 21741.97]. There was no difference in level of success between arbitrary preference compared with reward preference and perceptual judgment conditions, *OR* = .88, 95% CI [.58, 1.32]. There was also no difference between reward preference and perceptual judgement, *OR* = .79, 95% CI [.34, 1.55]. In terms of conformity, those who conformed were less successful (77% successful, *M* = .76, *SD* = .43) than those who did not (93% successful, *M* = .93, *SD* = .26), *OR* = .58, 95% CI [.28, .98]. At step 2, the change statistic was not significant, ΔR^2 = .01, X^2 (2, *N* = 168) = .68, *p* = .712; the full model was significant, R^2 = .24, X^2 (6, *N* = 168) = 23.69, *p* = .001. The pattern of results was not changed with the interaction terms in the model. Five-year-olds were more successful than three-year-olds, *OR* = 2.59, 95% CI [1.49, 20050.31]. There was no difference in success in arbitrary preference as compared to reward preference and perceptual judgment condition, *OR* = .98, 95% CI [.04, 23.10], and the interaction of this comparison with age was also non-significant, *OR* = 1.18, 95% CI [.05, 1.32]. Likewise, for between reward preference and perceptual judgment, *OR* = .90, 95% CI [<.01, 112.17], and its interaction, *OR* = 1.21, 95% CI [.01, 165.17]. However, again, children who conformed less were more successful, *OR* = .57, 95% CI [.27, .98].

Discussion

In summary, it was found that young children were more likely to conform to a consensus in the domain of an arbitrary preference condition compared to when there was a larger reward at stake or a correct perceptual judgment to make. However, 3-year-olds were more likely to conform than 5-year-olds. When considering the replication of the specific actions on the task, 5-year-olds were more faithful to the observed actions than 3-year-olds, and this included overimitating. Interestingly, children showed more overimitation in the reward preference and perceptual judgment conditions than in the arbitrary preference condition. Five-year-olds were also more successful compared to the 3-year-olds, irrespective of the condition; with those children who did not conform being more successful at the task.

A pivotal challenge for understanding children's learning and innovation is to establish when and why selectivity overrides fidelity (Carr, Kendal & Flynn, 2015, 2016; Over & Carpenter, 2012). The present study found that with regard to conformity, both domain and age influenced children's willingness to copy the actions of a unanimous majority. That is, rather than conforming blindly children process the domain relevant information and modulate their conformity in response to it. Children conformed more to demonstrated consensus when the norm demonstrated was arbitrary, rather than in a domain marked by a conflict with personal information, as in the perceptual judgment task, or against personal interest, in the reward preference task.

At a gross level, this finding shows that when there is a competing behavioural tendency (such as a desire to be correct or for a large reward) conformity will diminish. Theorists give us several potential explanations for this effect. First, arbitrariness is a cause of ambiguity, which may result in a child not knowing what underpins the cause of a preference (in the case of the arbitrary preference condition, there is no cause) and therefore adopts a strategy of conforming (Walker & Andrade, 1996). Such a bias has been called a 'copy-when-uncertain' strategy (Laland, 2012); the logic being that when one is uncertain taking on

the group behaviour is likely to lead to a more advantageous strategy than adopting a chance behaviour. Second, it may be that the child perceives the observed choice as purely conventional, or part of ritual, and thereby copies for injunctive/normative reasons; that is, the reproduction of the actions is the culturally right thing to do in this context (Legare et al., 2015; Kapitany & Nielsen, 2015). Such normative behaviour allows affiliation and smooth integration with group members, as well as the acquisition of instrumental information, even when the causes of the behaviour are opaque (Over & Carpenter, 2012). Teasing apart these normative versus informational motivations for conformity is a difficult undertaking for researchers. For example, it is notable that within our experiment the perceptual judgment task contains a competing social goal as the child needed to announce their response to the experimenter, and such socially relevant factors as presenting a response in public versus private have been shown to modulate children's conformity (Haun & Tomasello, 2011). But it appears that, despite such social pressure to copy the majority, under some contexts including when selecting which of two blocks is longer, the normative pressure to be correct is more powerful than the bias to copy a majority. In terms of the absolute levels of conformity observed, they were highest in the arbitrary preference condition (57%). Corriveau & Harris (2010) consistently observed conformity levels under 50%, whereas others have found higher levels (Bernard et al., 2015). The present experiment attests to the possibility that between task differences are likely to be important. Further, it is known that culture of the children in the experiment has a substantial impact (Corriveau & Harris, 2010; Corriveau et al., 2013). Similar previous research has shown that between condition effects are consistent over trials, though with conformity potentially diminishing (Bernard et al., 2015; Corriveau & Harris, 2010). This suggests that the pattern of results in the current experiment, using a single trial, is valid, although future research is needed to properly address how conformity levels change over time.

The present study corroborated previous research finding regarding children's greater willingness to eschew conformity as they develop (Corriveau & Harris, 2010; Seston Schillaci & Kelemen, 2014; Walker & Andrade, 1996). Such results accord well with Flynn, Turner, and Giraldeau (2016) which suggests that 5-year-olds show more selectivity and understanding of when to deploy social (as well as asocial) information than 3-year-olds. Although not borne out by inferential statistics in the present study, five-year-olds may have been tending towards similar levels of conformity to three-year-olds in the arbitrary condition (4% difference), but showing an apparent proclivity not conform when there was a compelling competing reason (25% difference in both conditions). Future research may see if such a difference is reliable if an older cohort of children is considered.

Likewise, our results reflect previous research showing that the quality and accuracy of imitation increases with age (McGuigan, Makinson & Whiten, 2011; McGuigan, Whiten, Flynn & Horner, 2007). In the present study this was evident in increased fidelity, overimitation, and success in 5-year-olds compared with 3-year-olds. Together these age results suggest that children become more competent over development at carrying out the learned behaviour or norms to which they have been exposed. Further, it was found that conforming children were less successful, they were less able to complete the task of retrieving the object from the apparatus, than non-conforming children. This makes sense in the light of Flynn and colleagues (2016), who found that children (5-year-olds specifically) who chose to learn individually, as opposed to socially, were more adept at completing a novel apparatus or tool-use task, than children who wished to learn socially, but received asocial learning instead. A potential explanation here being that children who depart from socially structured behaviour do so because they have succeeded using individual learning before, or can deduce an efficient solution.

By comparing normative domain judgement and imitation behaviour findings, the present study highlights again children's growing appreciation of how best to implement available information in their own behaviour, especially by five years old (in line with Flynn et al., 2016). Children are willing to eschew normative pressure to fulfil some motivated goal, as in attaining a reward, but may retain the methods used to achieve a goal. This suggests a hypothesis for continued research that children become more adept by the end of early development, at deploying available social information from the same sources, but about different aspects of a task (goal versus methods), to meet their own ends. Further, that departing from demonstrated goals and methods is bounded with children's capacity to efficaciously acquire success with their own techniques (Flynn et al., 2016).

It is notable that children overimiated more in the reward preference and perceptual judgment condition than in the arbitrary preference condition. It would seem hard to reconcile this difference with the hypothesis that overimitation in this study was the result of distorted causal understanding (e.g., Lyons, et al., 2007, 2011); that is, that children were more confused about if the redundant action was efficacious or not in the conditions with a competing motivation than when the choice was arbitrary (especially given the ability of children to dissociate goals and actions described above). Rather, our conjecture would be that the social expectations of the context may be playing a role, and that the overimiated action can be seen as part of an injunctive norm: a thing you are supposed to do (Kenward, Karlsson, & Persson, 2011; Keupp, Behne, & Rakoczy, 2013; Nielsen & Blank 2010; Over & Carpenter, 2012). Specifically, that in a context in which there was no right answer, there was no 'correct' actions to perform; whereas, when there is a correct or better option, a proportion of children may have inferred there was a correct way to perform the task, including the redundant action (which in reality posed little cost in terms of time).

Our results provide important insights into the development of conformity showing when, and under which conditions, young children copy the majority versus when they undertake an alternative. For society to function effectively, in terms of both technological and social systems, we must conform to a consensus. However, blind conformity has negative consequences including the transmission of misinformation and the stagnation of innovation, resulting in a lack of progress in cultural evolution (Dean, et al., 2014). Methodologically, our results speak to the necessity to consider how different cognitive and social factors affect the generalisability of conformity research with young children. Further, that there are important nuances around children's selectivity versus fidelity in copying goals and actions (Over & Carpenter, 2012). These results demonstrate how, within a Western culture, children are willing to deviate from a consensus when it is in their interest, in terms of acquiring a larger reward, or when the consensus is perceptually inaccurate and would result in an incorrect response being reported. However, when the cause for a consensus is ambiguous children conform. Such a finding show young children can make informed decisions so as not to simply 'follow the crowd'. In teaching children, these results suggest that providing clear information about the rationale for a majority's behaviour will aid children to make incisive decisions across domains about when, and when not, to conform.

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Figures

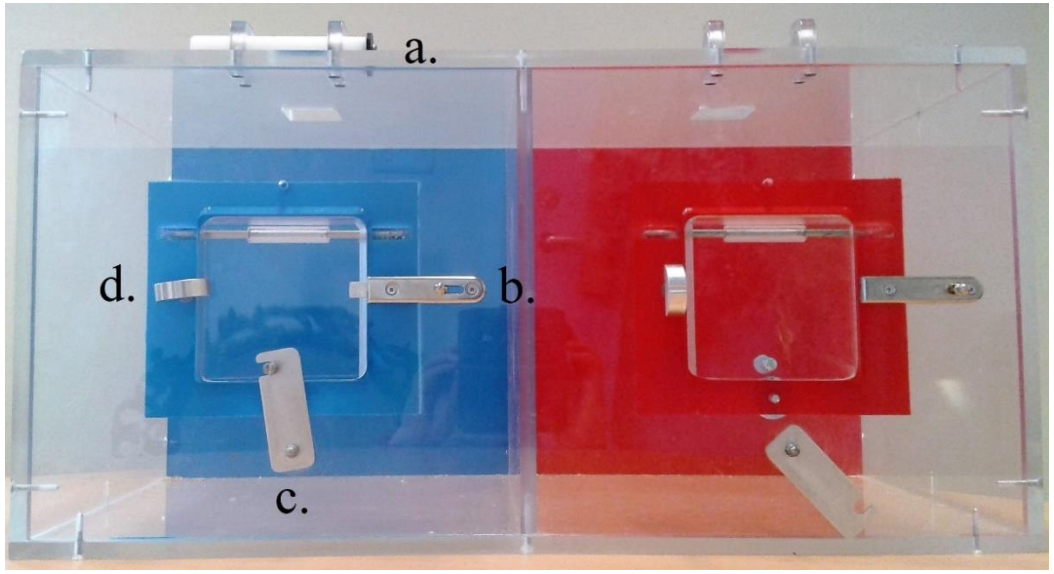

Figure 1. Duobox: left-side shows box in assembled state, right-side shows box with defences removed, (a) ‘bolt’, (b) ‘lock’, (c) ‘hook’, (d) ‘latch’.

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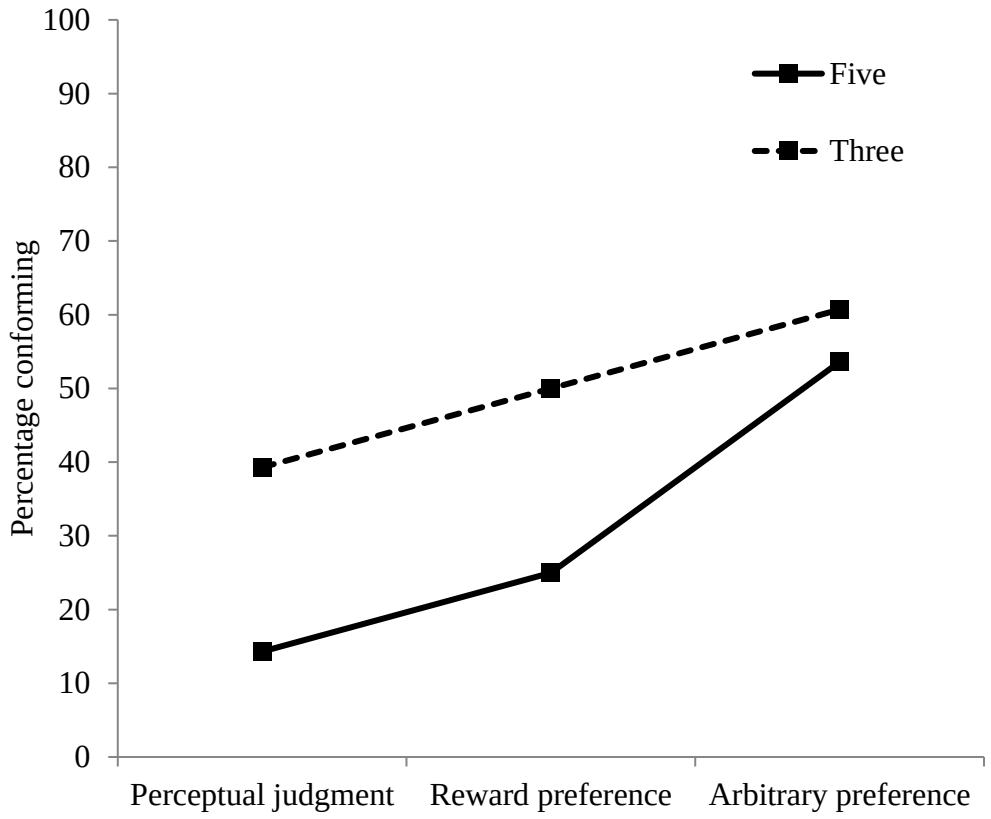

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609 *Figure 2.* The proportion of children matching the descriptive norm (conforming) by domain and age group.

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Tables

Table 1. Hierarchical binary multiple regression analyses of age and norm domain on outcome variables (conformity, imitation fidelity, overimitation and success). Rows contain predictors at each step and columns dependent variables and associated statistics.

	Conformity			Imitation fidelity			Overimitation			Success		
	β	*S.E.*	*p*	*β*	*S.E.*	*p*	*β*	*S.E.*	*p*	*β*	*S.E.*	*p*
Step 1												
Intercept	-.43	.17	.010*	-1.39	.28	.001*	-.11	.18	.529	2.28	2.11	.001*
Age	-.43	.18	.011*	.49	.22	.014*	-.60	.17	.001*	1.01	2.00	.002*
Arb. judg. vs. r. pref. & per. j.	.36	.12	.002*	-.24	.21	.128	-.26	.13	.032*	-.13	.32	.469
Per. judg. vs. r. pref.	.26	.22	.212	.17	.23	.434	-.25	.21	.210	-.24	.81	.467
Conformity				-.28	.24	.205	-.05	.18	.788	-.54	.46	.034*
Step 2												
Intercept	-.46	.50	.006*	-1.38	.88	.001*	-.12	.24	.503	2.25	.33	.001*
Age	-.46	.50	.006*	.43	.88	.020*	.60	.23	.001*	.95	.33	.004*
Arb. judg. vs. r. pref. & per. j	.37	.27	.001*	-.20	.69	.172	-.26	.20	.030*	-.02	.23	.919
Per. judg. vs. r. pref.	.28	.74	.190	.14	.96	.536	-.24	.22	.233	-.11	.40	.783
Age by Arb. j. vs. r. pref. & per. j.	.16	.27	.179	-.23	.68	.108	.03	.20	.840	.16	.23	.482
Age by Per. j. vs. r. pref.	.06	.73	.758	.11	.95	.612	.25	.21	.210	.19	.40	.638
Conformity				-.27	.25	.251	-.05	.19	.789	-.56	.26	.029*

$N = 168$ *$p < .05$.

Table 2. Descriptive statistics by age group and norm domain condition.

	Perceptual judgement		Reward preference		Percept. judg. & r. pref.		Arbitrary preference	
	%	(SD%)	%	(SD%)	%	(SD%)	%	(SD%)
Conformity	25	(44)	38	(49)	32	(47)	57	(50)
Three-years-old	39	(50)	50	(51)	44	(50)	61	(50)
Five-years-old	14	(36)	25	(44)	20	(40)	54	(51)
Imitation fidelity	25	(44)	30	(46)	28	(45)	14	(35)
Three-years-old	14	(35)	14	(36)	14	(36)	14	(36)
Five-years-old	36	(49)	46	(51)	41	(50)	14	(36)
Overimitation	60	(49)	48	(50)	54	(50)	36	(48)
Three-years-old	52	(51)	29	(46)	40	(49)	21	(42)
Five-years-old	68	(48)	68	(48)	68	(47)	50	(51)
Task success	93	(26)	86	(35)	89	(31)	82	(39)
Three-years-old	89	(32)	75	(44)	82	(39)	68	(48)
Five-years-old	96	(19)	96	(19)	96	(19)	96	(19)